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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/824,719	04/15/2004	Peter J. Schubert	89190.130903/DP-311079	6710

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EXAMINER
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THOMPSON, MELISSA

ART UNIT	PAPER NUMBER
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1745

MAIL DATE	DELIVERY MODE
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05/29/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/824,719	<b>Applicant(s)</b> SCHUBERT ET AL.	
	<b>Examiner</b> Melissa B. Thompson	<b>Art Unit</b> 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 08 March 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☐ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 25-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>see attached office action</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of claims 1-24 in the reply filed on March 8, 2007 is acknowledged. The traversal is on the ground(s) that combination/subcombination is improperly analyzed. This is not found persuasive because, as applicant argues, the specifics of each independent invention do not require the specifics of the other independent inventions. Therefore, because each invention does not require the specifics of the other, they are held as separate inventions and require different searches for each independent invention.

The requirement is still deemed proper and is therefore made FINAL.

### ***Information Disclosure Statement***

2. The IDS filed March 21, 2005 has been considered.

### ***Drawings***

3. The drawings are objected to because Figure 3 does not show the housing (44) as stated in the specification, page 9 line 29. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the

several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 20 and 24 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claim 20 recites the limitation "hydrogen storage member is formed from a silicon wafer" in lines 1 and 2. From the claim language and the specification, it is unclear what Applicant means by "formed from". Examiner needs clarification as to whether the silicon wafer is formed from a monocrystalline silicon or if the silicon is formed from a silicon wafer that was waste. Based on the language of the claim it is unclear exactly what Applicant is claiming. For the purposes of compact prosecution, the examiner is taking claim 20 to mean that a silicon wafer is formed from monocrystalline silicon to be used as the hydrogen storage member.

7. Claim 24 recites the limitation "the integrated circuit industry" in 2. There is insufficient antecedent basis for this limitation in the claim.

***Claim Interpretation***

8. Claim 16 is interpreted as not invoking 35 U.S.C. 112 sixth paragraph, "means for", language. Applicant's claim is improper with respect to 35 U.S.C. 112, sixth paragraph; since the group defining the means for releasing the hydrogen imparts sufficient structure, material, or acts for achieving the specified function. Therefore the claim does not comply with the 3-prong analysis for proper invoking of 35 U.S.C. 112, sixth paragraph. If 35 U.S.C. 112, sixth paragraph is actually trying to be invoked, the claim needs to be amended based on the rules of 35 U.S.C. 112, sixth paragraph.

A claim limitation will be \*presumed< to invoke 35 U.S.C. 112, sixth paragraph, if it meets the following 3-prong analysis:

(A) the claim limitations must use the phrase "means for " or "step for; "

(B) the "means for " or "step for " must be modified by functional language;

and

(C) the phrase "means for " or "step for " must not be modified by sufficient structure, material>,< or acts for achieving the specified function.

If Applicant does not intend to invoke 35 U.S.C. 112, sixth paragraph, the phrase "means for" should be deleted from claim 16.

***Claim Rejections - 35 USC § 102***

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1-5, 15, and 21-24 are rejected under 35 U.S.C. 102(b) as being anticipate by Winstel (U.S. Patent Number 4,265,720).

Winstel discloses a system for storing and retrieving elemental hydrogen (Figure 1) that includes a porous silicon (2 in Figure 1, as applied to claims 1 and 2).

Winstel discloses a housing for enclosing the hydrogen storage member (4) with a control system for regulating the storing of hydrogen into and retrieval of hydrogen from the storage member (6 in Figure 2, as applied to claim 3). The valve (6) in Figure 2 is interpreted as the control system.

Winstel discloses a plurality of hydrogen storage members (5 in Figure 2, as applied to claim 4).

Winstel discloses that the hydrogen storage member includes a porous silicon surface layer (2) over at least a first portion of the hydrogen storage member (5 in Figure 1, as applied to claim 5).

Winstel discloses a system with a releasing source for releasing stored hydrogen from the member (column 2, lines 63-68, as applied to claim 15).

Winstel discloses a system wherein the silicon is in a polycrystalline form (abstract, as applied to claim 21).

The product-by-process limitations of claims 22-24 are not given patentable weight since the courts have held that patentability is based on a product itself, even if the prior art product is made by a different process (see In re Thorpe, 227 USPQ 964, (CAFC 1985), In re Brown, 173 USPQ 685 (CCPA 1972), and In re Marosi, 218 USPQ 289, 292-293 (CAFC 1983)).

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

"The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior

art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989). See MPEP section 2113.

***Claim Rejections - 35 USC § 102/103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. Claims 1 and 8-14 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Koo et al. (U.S. Publication Number 2004/0165187 A1).



Koo et al. disclose porous silicon that has a column structure (paragraph 33, as applied to claims 1 and 8). The porous silicon is capable of storing and retrieving elemental hydrogen and is therefore considered to be a hydrogen storage member. The "system for storing and retrieving elemental hydrogen" is intended use.

Koo et al. disclose that the silicon columns have an aspect ratio of about 50 (paragraph 33, as applied to claim 9).

Alternatively it is not inherent that Koo et al. teach the silicon as a hydrogen storage member.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use porous silicon as a hydrogen storage member. By requiring in claim 1 that the storage member comprises silicon allows for the porous silicon of Koo et al. to be used as this storage member. Because the silicon is porous, it is capable of storing and retrieving hydrogen and could therefore be used as a hydrogen storage member required by claim 1.

The product-by-process limitations of claims 10-14 are not given patentable weight since the courts have held that patentability is based on a product itself, even if the prior art product is made by a different process (see In re Thorpe, 227 USPQ 964, (CAFC 1985), In re Brown, 173 USPQ 685 (CCPA 1972), and In re Marosi, 218 USPQ 289, 292-293 (CAFC 1983)).

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The

patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

"The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989). See MPEP section 2113.

***Claim Rejections - 35 USC § 103***

14. Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Winstel (U.S. Patent Number 4,265,720).

The disclosure of Winstel has been discussed above and is incorporated herein.

Winstel does not teach that the percent void volume of the surface layer is about 50%.

It would have been obvious to one of ordinary skill in the art at the time of the invention to have the percent void volume, of the silicon surface layer of Winstel, to be about 50%. The silicon surface layer is used to absorb and release the hydrogen in the hydrogen storage container and because this is the silicon's use in the hydrogen storage member of Winstel it would obviously have porosity. Although, Winstel does not explicitly state the percent void volume of the silicon surface layer, it is obvious that there must be a percent void volume percent due to the purpose of the silicon. The criticality of this percent void volume must be shown in order for the amount to patentably distinct.

15. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Winstel (U.S. Patent Number 4,265,720) as applied to claim 5 above, and further in view of Nishimura et al. (U.S. Patent Number 5,797,269).

Claim 7 is interpreted to mean that there are one or more electronic integrated circuit elements.

The disclosure of Winstel has been discussed above and is incorporated herein.

Winstel does not teach that the second portion of the hydrogen storage member includes electronic integrated circuit elements.

Nishimura et al. teach a hydrogen storage member (10 in Figure 1) with a temperature sensor (10 in Figure 8, as applied to claim 7).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include the temperature sensor of Nishimura et al. in the

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hydrogen storage member of Winstel. By including a temperature sensor, the hydrogen storage member can be monitored to ensure a stable temperature. The hydrogen storage member of Winstel requires a certain temperature to release the hydrogen and would therefore require a temperature sensor to ensure that a certain temperature is reached.

16. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winstel (U.S. Patent Number 4,265,720) as applied to claim 15 above, and further in view of Meinzer (U.S. Patent Number 5,360,461).

The disclosure of Winstel has been discussed above and is incorporated herein.

Winstel does not teach that releasing source is selected from the group consisting of light, current, voltage, and combinations thereof or that light is provided by a light-emitting diode with a wavelength of about 660nm.

Meinzer teaches a hydrogen storage member (2) that uses a light-emitting diode (18) to release the hydrogen, with a wavelength of approximately 660nm (column 5, lines 43-44, as applied to claims 16-18).

It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the hydrogen releasing source of Meinzer for the hydrogen releasing source of Winstel. Both hydrogen releasing source allow hydrogen to be released from the hydrogen storing member, therefore, it would be obvious to substitute on for the other.

17. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Winstel (U.S. Patent Number 4,265,720) as applied to claim 1 above, and further in view of Masataka et al. (JP Publication Number 08-330316).

The disclosure of Winstel has been discussed above and is incorporated herein.

Winstel does not teach that the silicon is monocrystalline form and that it is formed into a silicon wafer.

Masataka et al. teach monocrystalline silicon that is formed into a silicon wafer (paragraph 1, as applied to claims 19 and 20).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the monocrystalline silicon wafer of Masataka et al. in the hydrogen storage member of Winstel. The use of a monocrystalline silicon wafer makes the silicon very stable thermally and prevents property degradation (paragraph 44). Using a monocrystalline silicon wafer in the hydrogen storage member of Winstel will ensure that the system functions properly at high temperatures and that silicon's properties will not degrade with continued use.

### ***Conclusion***

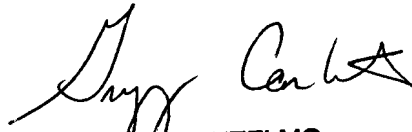
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa B. Thompson whose telephone number is (571) 272-2758. The examiner can normally be reached on Monday through Friday from 8am to 5pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MBT

  
GREGG CANTELMO  
PRIMARY EXAMINER

24 MAY 2007